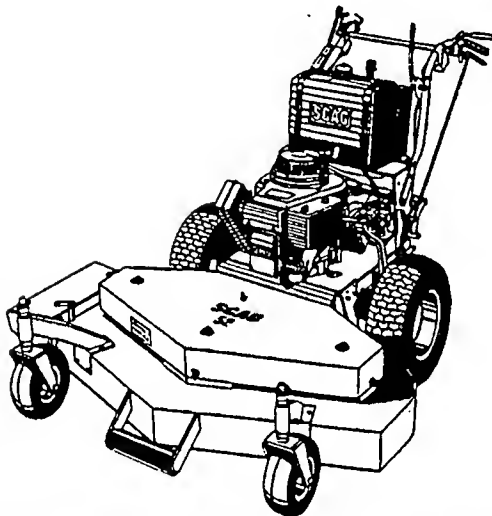


SCAG®

ZERO TURN RADIUS COMMERCIAL MOWERS TECHNICAL MANUAL



MODELS

SWZ32-13KA

PATENT NO. 4,885,903

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SAFETY INSTRUCTIONS

Your mower is only as safe as the operator! As with any type of power equipment, carelessness or error on the part of the operator may result in serious bodily injury. In addition, improper maintenance of the machine can also result in injury. To reduce the potential for injury, please read and follow these instructions on safe operation and be certain that anyone using this mower fully understands and complies with the following instructions.

BEFORE OPERATING

1. Read and understand the contents of this Technical Manual before operating the machine. Become familiar with all controls and know how to stop quickly. A free replacement manual is available by sending complete Model and Serial Number to:
Scag Power Equipment, Inc.
1000 Metalcraft Drive
Mayville, WI 53050
2. Do not allow children to operate the machine. Do not allow adults to operate the machine without proper instruction.
3. Before attempting to start engine, move speed adjustment lever to neutral position, move blade clutch lever into STOP position and move neutral latches to NEUTRAL LOCK.
4. Remove all debris or other objects that might be picked up and thrown by the cutter blades. Keep all bystanders away from the mowing area.
5. Keep all shields, safety devices, and decals in place. If a shield, safety device or decal is defective or damaged, repair or replace it before operation is commenced. Also, tighten all loose nuts, bolts and screws to assure machine is in safe operating condition.
6. Do not operate machine while wearing sandals, tennis shoes, sneakers or shorts. Also, do not wear loose fitting clothing which could get caught in moving parts. Always wear long pants and substantial shoes. Wearing safety glasses and safety shoes is advisable and required by some local ordinances and insurance regulations.
7. Fill fuel tank with gasoline before starting the engine. Avoid spilling gasoline. Since gasoline is flammable, handle it carefully.
 - A. Use an approved gasoline container.
 - B. Do not fill tank while engine is hot or running.
 - C. Do not smoke while handling gasoline.
 - D. Fill fuel tank outdoors and up to about one inch (25 mm) below the bottom of the filler neck.
 - E. Wipe up any spilled gasoline.

WHILE OPERATING

8. To start engine, move speed adjustment lever to neutral position, move blade clutch lever into STOP position and neutral latches into NEUTRAL LOCK position.
9. Do not run the engine in a confined area without adequate ventilation. Exhaust fumes are hazardous and could possibly be deadly.
10. Using the machine demands attention. To prevent loss of control:
 - A. Mow only in daylight or when there is good artificial light.
 - B. Watch for holes or other hidden hazards.
 - C. Do not drive close to a drop-off, ditch, creek or other hazard.
 - D. Reduce speed when making sharp turns and when turning on hillsides.
 - E. Always be sure of your footing. Keep a firm hold on the handle and walk--never run.
 - F. Do not operate where conditions are slippery.
11. The discharge chute must always be installed and in the down position on the side discharge cutting unit except when optional grass catcher is completely installed. If the cutting unit discharge should plug, shut engine off and wait for all movement to stop before removing obstruction.
12. Disengage the blades and wait for them to stop before crossing gravel drives, walks or roads.
13. Shut the engine off and wait until the blades come to a complete stop before removing the grass catcher container.
14. Never raise the cutting unit while the blades are rotating.
15. If the cutting blades should strike a solid object or the equipment should start to vibrate abnormally, stop the engine, disconnect the spark plug wire, and check immediately for the cause. Vibration is generally a warning of trouble. Check the cutting unit and traction unit for damaged or defective parts. Repair any damage before starting the engine and operating the cutter unit. Be sure blades are in good condition and blade bolts are tight.
16. Always park the mower and/or start the engine on a level surface. If this is not possible, block the wheels to prevent the mower from moving when you are not in the operator's position.
17. Cut grass slopes carefully. Do not start, stop or turn suddenly. Mow across the face of slopes; never up or down. Do not mow excessively steep slopes.

SAFETY INSTRUCTIONS CONT'D

18. Do not touch engine or muffler while engine is running or soon after it is stopped. These areas could be hot enough to cause a burn.
19. Before leaving the operator's position or leaving mower unattended, move speed adjustment lever into NEUTRAL position, place neutral latches in NEUTRAL LOCK position, move cutter blade engagement lever to STOP and shut OFF engine.
20. Do not pass or stand on the grass discharge side of any mower with the engine running. Stop operation when another person approaches.


MAINTENANCE AND STORAGE


21. Disconnect high tension wire from spark plug to prevent accidental starting of the engine when servicing, adjusting or storing the machine.
22. If mower must be tipped to perform maintenance or adjustment, remove battery, drain gasoline from fuel tank and oil from crankcase.
23. To reduce potential fire hazard, keep the engine free of excessive grease, grass, leaves and accumulations of dirt.
24. Be sure machine is in safe operating condition by keeping nuts, bolts, and screws tight. Check the blade mounting bolts and nuts frequently to be sure they are tightened.
25. If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing and other parts of the body away from the cutting unit blades and other moving parts.
26. Do not overspeed the engine by changing governor settings. To be sure of safety and accuracy, have an authorized dealer check maximum engine speed with a tachometer.
27. Engine must be shut off before checking oil or adding oil to the crankcase.
28. Allow engine to cool before storing mower in any enclosure such as a garage or storage shed. Make sure the mower fuel tank is empty if machine is to be stored in excess of 30 days. Do not store mower near any open flame or where gasoline fumes may be ignited by a spark.
29. Always store gasoline in a safety-approved, red container.


30. Keep the mower and fuel container in locked storage to prevent children from playing and tampering with them.
31. Perform only those maintenance instructions described in this manual. If major repairs are ever needed or assistance is desired, contact an Authorized Scag Dealer. To ensure optimum performance and safety, always purchase genuine SCAG replacement parts and accessories. NEVER USE "WILL-FIT" replacement parts and accessories made by other manufacturers. Using unapproved replacement parts and accessories may void the warranty.
32. Be careful when servicing the battery as it contains acid, which is corrosive and could cause burns to skin and clothing.
33. Batteries release explosive gases when being charged or discharged. KEEP away from any source of sparks and/or flame.

HYDRAULIC SAFETY

The (2) two hose lines connecting each pump to each motor are pressurized hose lines. Whenever disconnecting these hose lines, the pressure must be relieved first. To relieve pressure, open up the dump valve on the pump and slowly crack open the hose fitting approximately 2 to 3 turns. If hydraulic fluid bubbles through cracked fitting and there is still pressure inside the line, let pressure relieve itself through cracked open fitting.

 **WARNING:** Hydraulic fluid escaping under pressure may have sufficient force to penetrate skin and cause serious injury. If foreign fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

 **WARNING:** Keep body and hands away from pin holes or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard and not hands to search for leaks.

 **WARNING:** Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.

ASSEMBLY INSTRUCTIONS

ELECTRIC START UNITS ONLY!

Before proceeding with assembly, prep the battery. Remove battery from unit and put on a flat surface. Fill each cell with electrolyte until the top of the plates are covered, charge the battery at 3 to 4 amps for 4 hours (this insures a good initial charge), check and add electrolyte as needed to bring the fluid level to the bottom of the split ring, and then wash and dry off the battery.

NOTE: Once the above fill and charge procedure has been completed only distilled water should be added to the battery cells.

To install battery on to the mower follow assembly instructions supplied in the battery kit.

! WARNING: Severe chemical burns can result from improper handling of battery electrolyte. Use proper eye, skin and clothing protection to prevent contact with eyes, skin and clothing.

External contact: Flush with water.

Internal contact: Drink large quantities of water, followed with milk of magnesia, beaten egg or vegetable oil.

CALL A PHYSICIAN IMMEDIATELY!

IMPORTANT - In case of internal contact DO NOT give fluids that would induce vomiting.

Eye contact: Flush with water for at least 15 minutes and GET MEDICAL ATTENTION IMMEDIATELY!

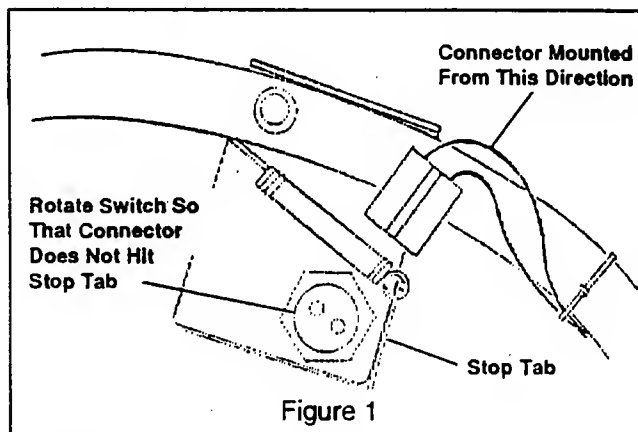
! WARNING: Explosive gases are vented from a battery when being charged or discharged which could explode if exposed to a flame or spark.

SET-UP ALL UNITS

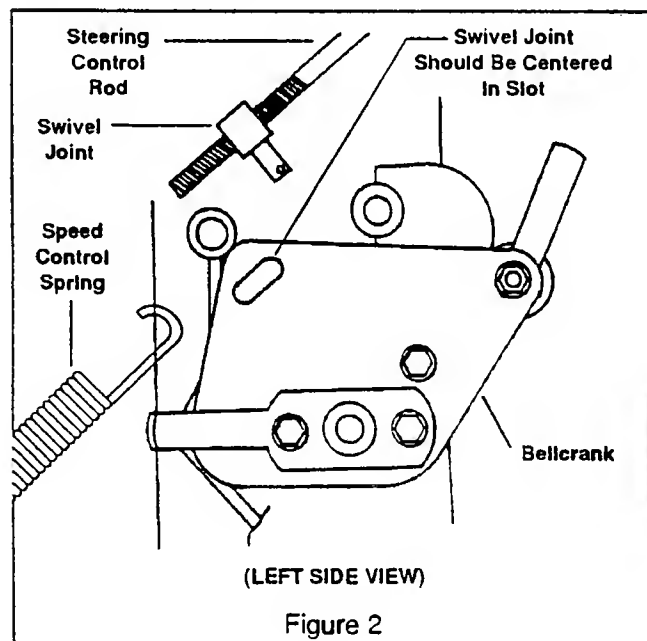
1. Lay out hardware according to the "Where Used" list in the List of Hardware Package Contents.
2. Install handle assembly to handle mounting frame using (4) four 3/8-16 x 1" bolts, flat washers, and elastic stop nuts. Three different handle heights can be obtained using one of the three slotted holes in the handle mounting frame.
3. Route the throttle control below the handle mounting frame and up the right side of handle. Secure to handle with (1) one 1/4-20 x 2" hex head bolt and elastic stop nut. Secure cable about half way down the handle using a cable tie.

NOTE: Check that the throttle cable moves the carburetor controls through their full range including choke. If not, adjust as required.

4. Route the safety interlock wires up the left handle tube and attach the connector to the switch as shown. Be certain that the connector does not hit the safety lever stop tab. If it does, rotate the switch to the position shown (See figure 1). Secure wires with cable ties.



5. Installing steering control rods. Thread rod into swivel joint. Adjust length of rod so that with the handle neutral latch in the neutral position, (See figure 3) the swivel joint is centered in the slot on the bellcrank (See figure 2). This is easily confirmed by wiggling the handle control lever up and down. The bellcrank should not move if the swivel joint is centered in the slot. **This is a very, very important adjustment for safe operation!**



ASSEMBLY INSTRUCTIONS CONT'D

6. Remove swivel joint from slot (making sure swivel joint does not turn on rod). Connect speed control spring (See figure 2). Reposition swivel joint into slot and secure with hair pin cotter.

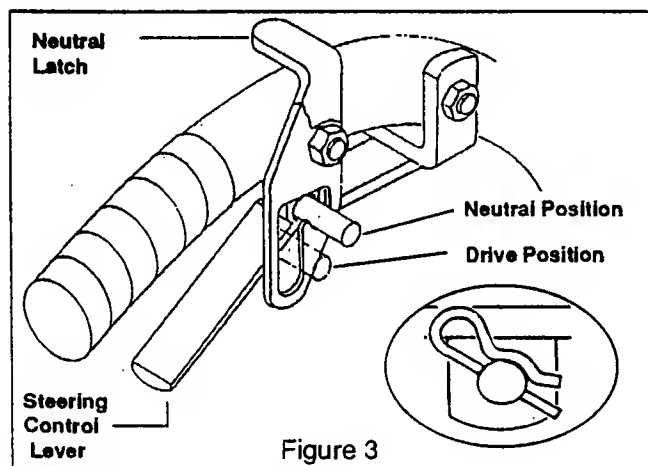


Figure 3

7. Installing speed control rod.
 - a) Thread swivel joint onto speed control rod.
 - b) Insert end of swivel joint through hole in speed control bellcrank and secure with hair pin cotter. Rotate bellcrank forward and down (See figure 4).

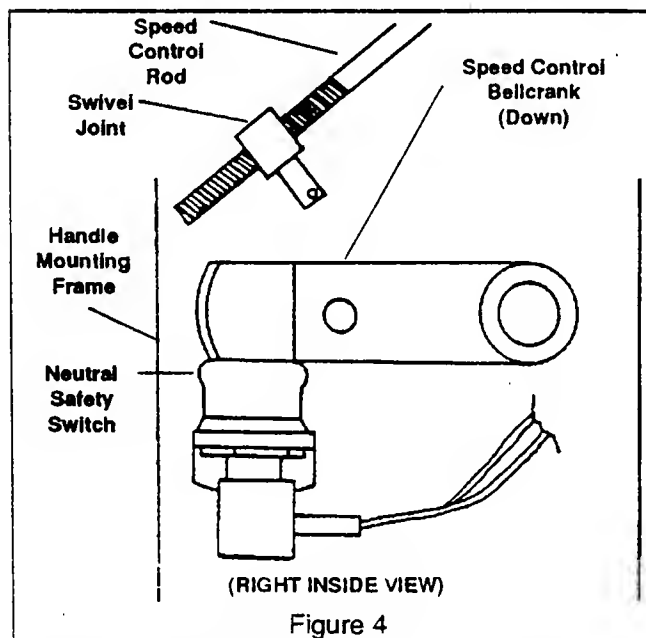


Figure 4

- c) Shift speed adjustment lever to the neutral position, depress neutral switch with speed control bellcrank, and adjust the speed control rod so that it fits into the hole in the speed adjustment lever. Secure with hairpin cotter.

8. Attach fuel tank (See figure 5) as follows:
 - a) Wrap the straps around the fuel tank to pre-form them, then set aside to be used later.
 - b) Position the four rubber pads on to the gas tank. 2 - 1/4" thick pads in the strap grooves on top and 2 - 3/8" pads with adhesive bottoms in the strap grooves between the gas tank and handle mounting frame. Attach the adhesive side of the bottom two pads to the handle mounting frame.
 - c) Position the tank so the SCAG logo is forward. Place the straps around the tank going under the handle mounting frame, secure the strap together in front using (2) two 1/4-20 x 2" slotted machine screws and hex nuts. Tighten screws until the tank will not slide around. Over tightening will damage the tank or straps.
 - d) Attach the fuel line to the valve on the bottom of the tank.

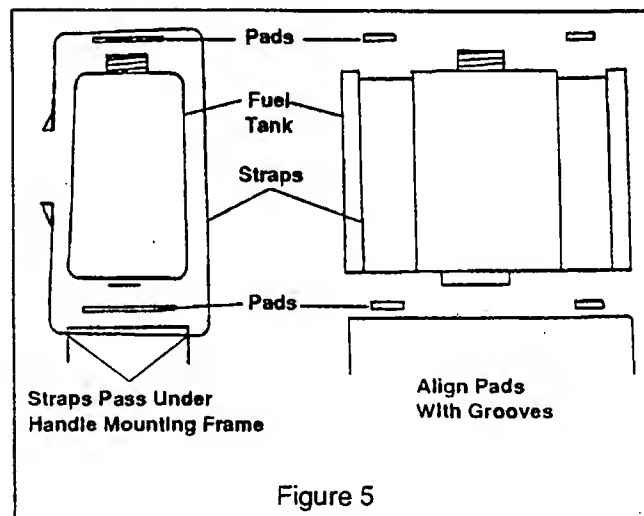


Figure 5

9. Check engine oil level, add as necessary .
10. Check hydrostatic oil reservoir. Oil level should be 3" from top of reservoir (not top of filler neck). DO NOT OVERFILL !!! Add SAE 10W30 motor oil if necessary.
11. Fill fuel tank with gasoline and then open shut-off valve under tank.

ASSEMBLY INSTRUCTIONS CONT'D

CUTTER DECK DRIVE ADJUSTMENTS

1. Engage blade clutch lever and check for proper over center clearance. There should be about 3/8" between rod and straight edge (see figure 7). Bend the stop tab to adjust clearance.

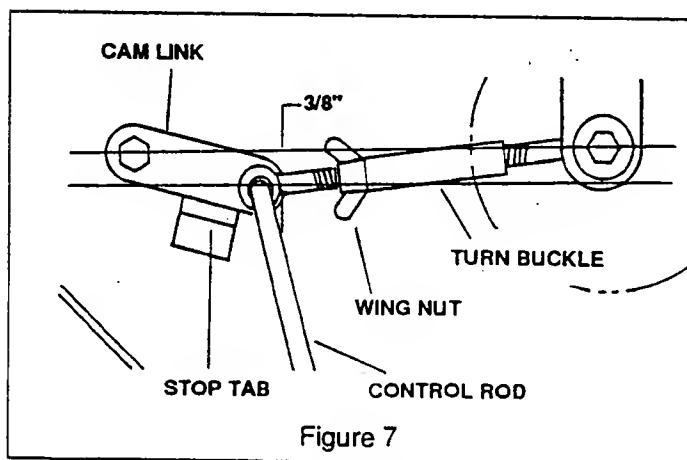


Figure 7

2. Adjust belt tension so that the belt moves 1/2" with 10 lbs. of pressure applied between the two spindle pulleys. Adjustment is made by loosening the wing nut and tightening/loosening the turn buckle (see figure 7).

NOTE: Belt tension may need to be increased or decreased 1 to 2 lbs. to achieve lowest vibration in belt.

CUTTER DECK ADJUSTMENTS

Due to the many conditions that exist, it is difficult to suggest a setting that will work for every lawn. There are two adjustments that can be made on these decks, pitch and height.

PITCH is the angle of the blades (comparing front to rear). A *positive pitch* is when the front (leading) edge of the cutting plane is lower than the rear (trailing) edge, *level pitch* is when both front and rear are the same height, a *negative pitch* is when the leading edge is higher than the rear edge. We suggest that a positive pitch is used when cutting grass. The front of the deck should be 1/4" to 1/2" lower than the rear of the deck.

HEIGHT is the nominal distance the blade is off of the ground. This measurement is made with the blades pointed side to side and distance is measured between cutting tip and ground.

TAPERED BEARING SPINDLE ASSEMBLY

Adjusting the blade height can be done by moving any number of the four smaller 1/4" spacers on the blade mounting bolts to the top of the spindle shaft or below the spindle shaft. (All blades should be positioned equally). The tapered bearing spindle has a large 1/4" spacer that is installed directly below the spindle housing and is secured to the spindle with two roll pins. The blade can be adjusted all the way up to the spindle assembly if all the smaller 1/4" spacers are removed and installed above the pulley. The larger 1/4" spacer can then be removed along with the roll pins. (Do not install the larger 1/4" spacer above the pulley, store it in a convenient location away from the machine). When any 1/4" spacers are installed above the blades the larger 1/4" spacer must be installed directly below the spindle housing. If a smaller 1/4" spacer is installed directly below the spindle housing and contacts the retaining ring this will cause a spindle failure and not be warrantable. For best cut and discharge a minimum of three spacers should be between the blade and spindle. (SEE FIGURE 10)

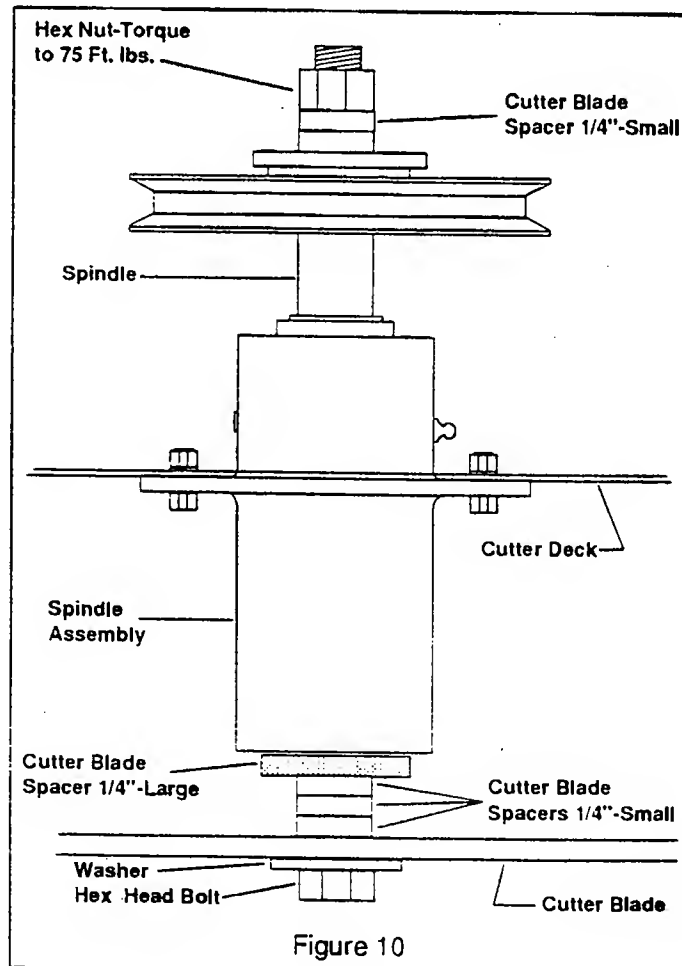


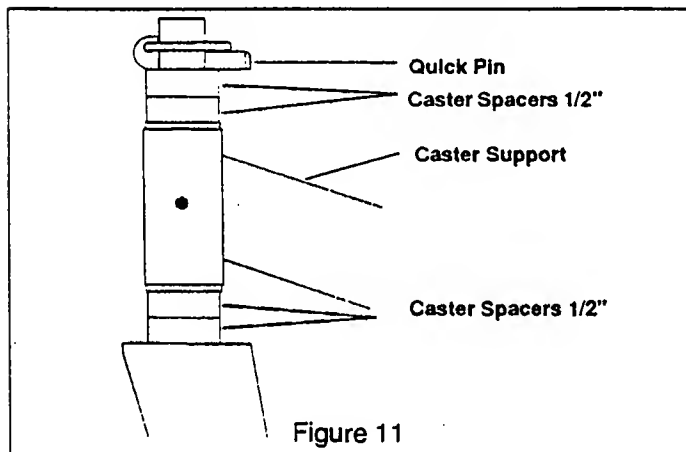
Figure 10

ADJUSTMENTS CONT'D

Additional range to the cutting height can be achieved by repositioning the cutter deck in relationship to the engine deck (This adjustment can also effect the pitch of the deck). There are 3 positions (see figure 6), suggested mounting is the middle holes. For cutting lower, mount the deck in the top holes. To cut higher, mount the deck in the bottom holes.

Remember to check the cutter deck belt alignment. Shimming or attaching the idler mounting bracket from underneath may be necessary to maintain belt life.

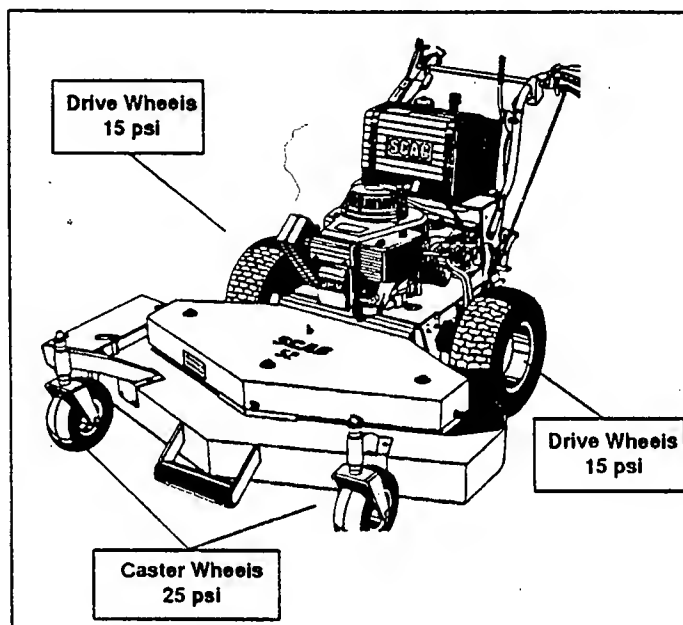
Caster spacers also can be repositioned to change cutting heights and to change the pitch of the deck (see figure 11).



HYDRAULIC PUMP DRIVE BELT

The hydraulic pump drive belt is spring loaded and does not require tensioning.

TIRE PRESSURES

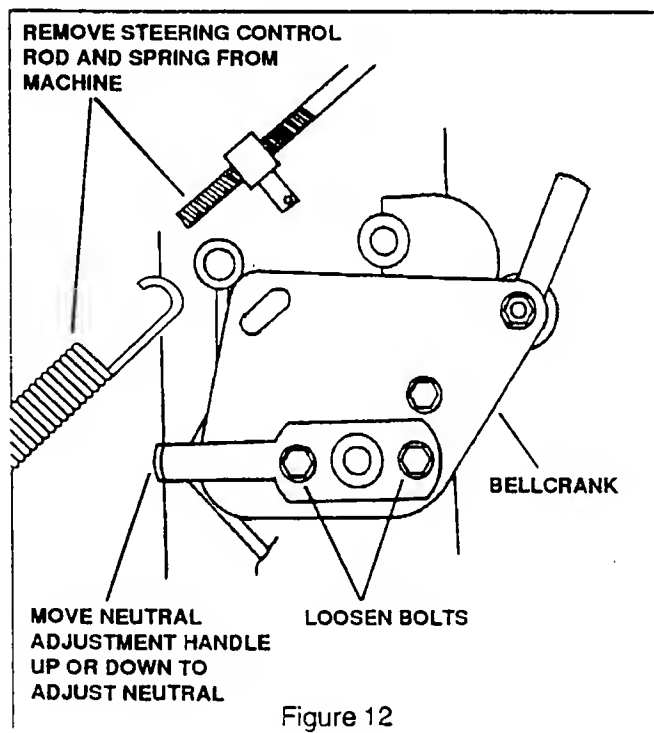


ADJUSTMENTS CONT'D

NEUTRAL ADJUSTMENT

This is the only adjustment to properly set neutral.

1. Locate machine in a secure area, away from bystanders, and preferably facing a wall. Raise drive wheels off the ground. Block caster wheels.
2. Remove the steering control rod and the speed control spring from the machine. (See figure 12)
3. Start engine and allow system to warm up for a few minutes.
4. Move the speed adjustment lever up on the handle into a forward speed. This will move the speed adjustment cam away from the cam bearing.
5. If the drive wheels rotate, loosen the bolts on the neutral adjustment handle and move the handle up or down until the wheels are in neutral. (See figure 12)

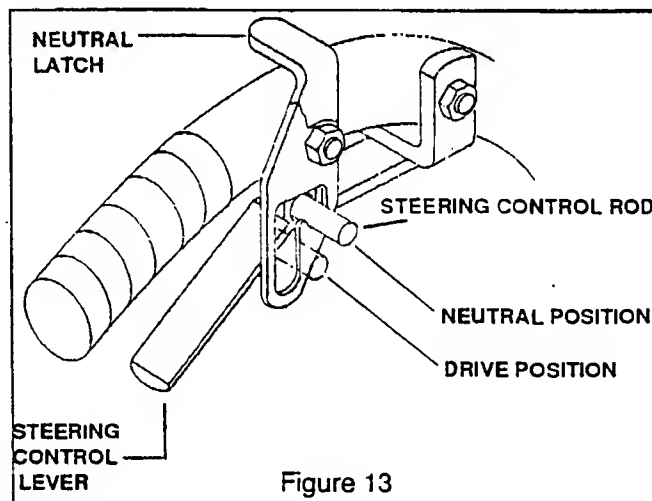


6. Retighten the bolts on the neutral adjustment handle. When tightening the bolts, hold onto the bellcrank to prevent it from rotating and throwing off the neutral adjustment.
7. Turn off engine.
8. The neutral is now adjusted. Do not try to adjust neutral with the speed control rods or the speed adjustment cam.

STEERING CONTROL ROD ADJUSTMENT

This adjustment is made to allow the steering control lever to be moved out of neutral without engaging reverse.

1. Connect the steering control rods into the steering control lever up on the handles. Do not install the hair pin through the rod at this time. (See figure 13)
2. Put the steering control lever into neutral. (See figure 13)



ADJUSTMENTS CONT'D

3. Turn the swivel joint on the steering control rod until the swivel joint lines up in the center of the slot in the bellcrank. This will allow the control rod to be moved back when shifting out of neutral and not move the bellcrank. (See figure 14)
4. Remove the steering control rod from the machine and install the speed control spring onto the swivel joint and then reconnect the control rod back onto the machine. Make sure that the swivel joint does not turn on the control rod while you are doing this.
5. Install the hair pins into the control rod up at the handle and into the swivel joint.

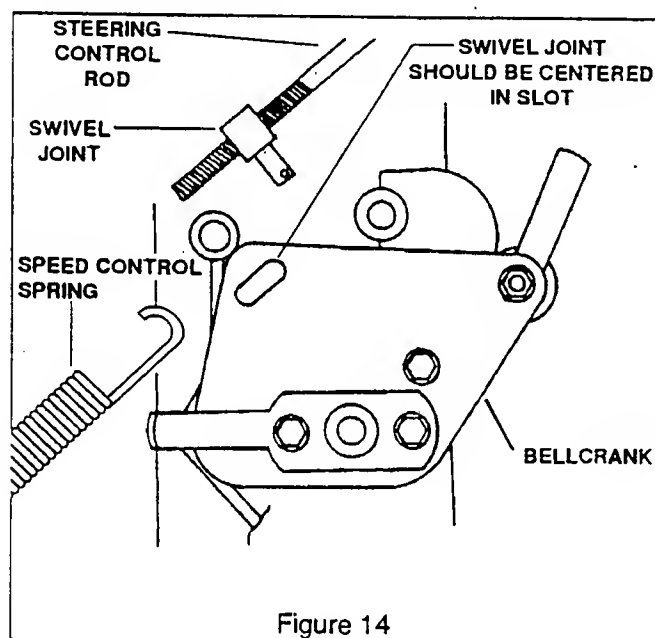


Figure 14

TRACKING STRAIGHT ADJUSTMENT

This adjustment will allow the machine to travel in a straight line at the normal operating speed.

1. Loosen the two bolts securing the speed adjustment bearing to the bellcrank. (See figure 15)
2. Move the speed adjustment lever, up on the handles, into the neutral position.
3. Place the speed adjustment bearing where it just contacts the speed adjustment cam. (See figure 15)

4. Tighten the two bolts securing the speed adjustment bearing.
5. Put the machine on a flat level surface (preferably on grass) and start engine.

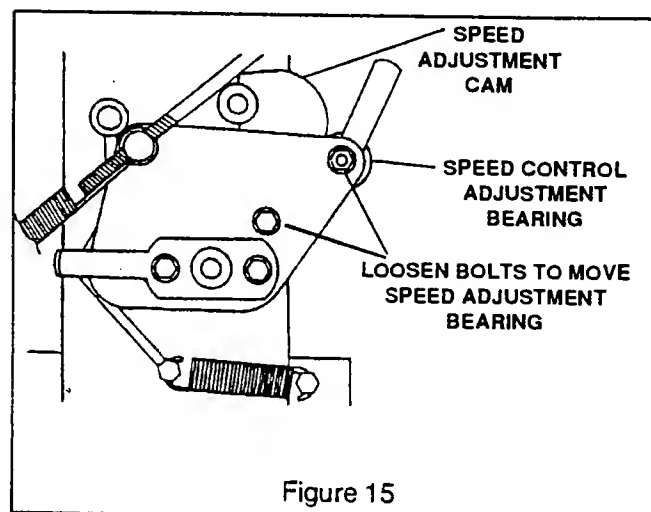



Figure 15

6. Place speed adjustment lever into the forward speed used most often and see if machine tracks straight.
7. If machine pulls to one side, put the speed adjustment lever back into neutral and shut off engine.
8. If the machine pulls to the left, on the left side of the bellcrank, loosen the two securing bolts and move the adjustment bearing 1/16" away from the cam and retighten the bolts. Restart engine and check for tracking straight. (See figure 15)
9. The farther the adjustment bearing is moved away from the cam, the faster that side will drive. Continue adjusting bearing until tracking in a straight line is achieved.
10. Conversely, if machine turns to the right, adjust the right bearing away from the cam.
11. Never move the bearing forward beyond just touching the cam, or reverse will be engaged unintentionally.

INITIAL RUN-IN

 **WARNING:** Use extreme caution during mower's initial run-in to assure caster wheels are adequately blocked and drive wheels do not inadvertently contact ground. Keep bystanders away from machine. Never allow mower to discharge towards someone. Never leave the machine unattended during the initial run-in.

1. Lubricate all fittings as specified in Lubrication Chart.
2. Locate machine in a secure area, away from bystanders, and preferably facing a wall. Raise drive wheels off ground. Block caster wheels.
3. Start engine and shift speed adjustment lever to mid range. Engage cutter blades. Set throttle for 3/4 of full engine rpm.
4. Run the machine for a few minutes.
5. Declutch cutter blades, shift speed adjustment lever into NEUTRAL, Stop engine.
6. Check tension of blade drive belt(s). Adjust if necessary.
7. If necessary, readjust steering control neutral and speed control adjustment neutral as indicated in the Adjustments Section.
8. Check function of all safety interlocks. Make sure that engine will not start unless speed control lever is in neutral and blade clutch is disengaged.
9. Check tire pressure and adjust to:

Caster Wheels	25 psi.
Drive Wheels	15 psi.

OPERATING INSTRUCTIONS

1. Read and understand the instructions on safety before attempting to operate.
 2. Before starting engine:
 - * Fuel valve must be opened.
 - * Speed control lever must be in NEUTRAL.
 - * Blade clutch lever must be in STOP position.
 - * Neutral latches must be in NEUTRAL LOCK position.
 - * Key switch on.
 - * Choke as required.
 3. Start engine. Adjust throttle.
 4. Engage cutter blades by pushing blade clutch lever forward until it snaps into the ON position. Pull lever back to disengage cutter blades.
 5. While squeezing steering control levers with both hands, release both neutral latches.
 6. When steering control levers are released, machine will travel straight. To make a right turn, squeeze RH lever; to turn left, squeeze LH lever.
 7. Shift speed control lever for desired mowing speed.
- NOTE:** *Top speed is suggested only for transport!*
8. TO STOP wheel drive, shift speed control lever into neutral, squeeze both steering levers, lock neutral latches.
 9. For reverse, pull up on the steering control levers.
 10. Before turning unit off, be certain blade clutch lever is in the OFF position, neutral latches are in NEUTRAL position, and speed control lever is in NEUTRAL.

MAINTENANCE

AIR BLEED PROCEDURE

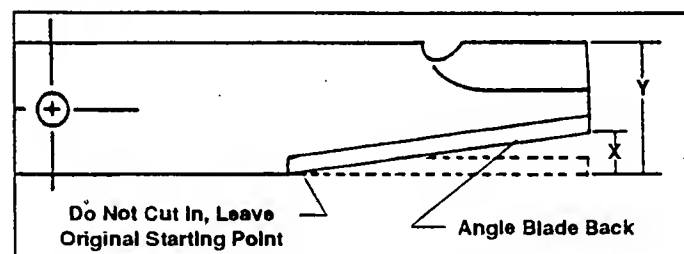
Air must be bled from hydraulic system when any of the hydraulic drive components are removed and when hydrostatic oil is changed.

1. With oil in reservoir, disconnect hose line from each pump to oil filter (middle front port) at the pumps (see illustration below).
2. Plug disconnected hose lines.
3. Watch for oil to drip at a steady rate from open ports on pumps. When this happens, unplug hose lines and reconnect to ports.
4. Locate machine in a secure area, away from bystanders, and preferably facing a wall. Raise drive wheels off ground. Block caster wheels.
5. Run machine at full forward speed for approximately 30 seconds and then run in reverse for approximately 30 seconds.
6. If neutral needs to be adjusted, follow procedure in adjustments section of this manual.

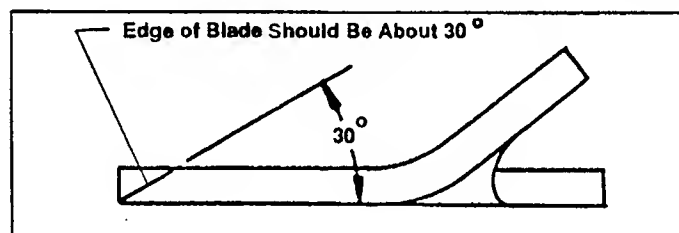
FREEWHEEL POSITION

To move machine around without having the engine running, rotate dump valve levers located on the back left hand side of the pump approximately 1/2 turn. Levers must be returned to original position in order to operate machine.

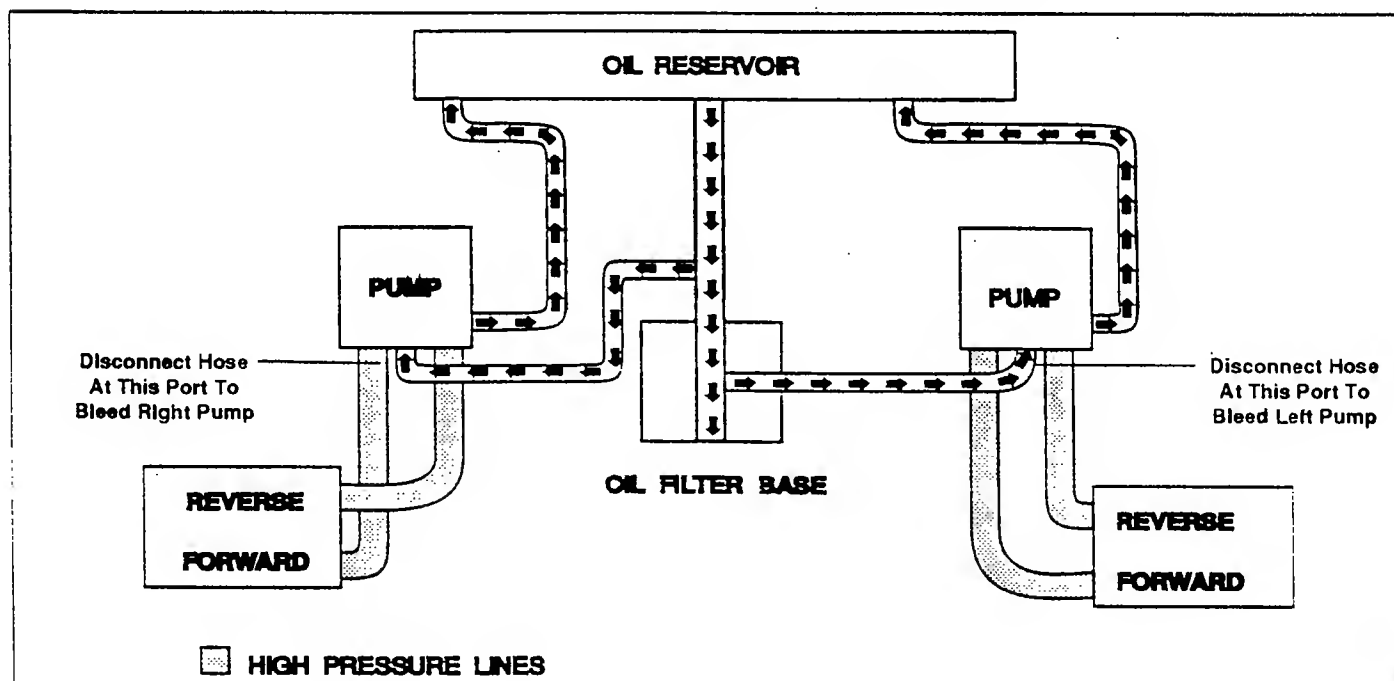
CUTTER BLADES



Do not sharpen (X) beyond 1/3 of the width (Y) of the blade.



Suggestion: Dress the blade with a file. Using a wheel grinder may burn the blade.



LUBRICATION & MAINTENANCE

Break-In			
8 Hours (Daily)			
40 Hours (Weekly)			
100 Hours (Biweekly)			
200 Hours (Monthly)			
		PROCEDURE	COMMENTS
X		Check all hardware for proper tightness	Adjust oil level as needed - SAE 10W30
X		Change engine oil and filter at 5 hours	
X		Change hydrostatic oil filter at 20 hours	
X	X	Check engine oil	Do not over fill
X	X	Remove debris from under belt cover	MORE OFTEN IF NEEDED
X	X	Sharpen cutter blades	" " "
X	X	Clean air filter	" " "
X	X	Clean blower screen	" " "
X	X	Grease spindle bearings 2 pumps of hand gun	+ US Lithium MP White Grease 2125
X	X	Check battery acid level	Distilled water only
X	X	Check tire pressure	Add or adjust as required
X	X	Change engine oil	MORE OFTEN IF NEEDED
X	X	Replace air filter	MORE OFTEN IF NEEDED
X	X	Grease caster wheel bearings	Chassis grease
X	X	Grease caster wheel pivots	Chassis grease
X	X	Grease idler arm pivots	Chassis grease
X	X	Change engine oil filter	See engine mfg. information
X	X	Check all hardware for proper tightness	See engine mfg. information
X	X	Check hydrostatic fluid reservoir level	
X	X	Clean and adjust spark plugs	
		Every 500 hours	
		Drain Hydraulic System and replace fluid	Use SAE 10W-30 motor oil
		Change hydrostatic oil filter	Clean area before removing filter

* Depending on climate and environment, lubrication may be required every 8 to 40 hours.

* Do not over grease as this may damage seal.

+ Compatible Greases:

Lidok EP #2 found at industrial shops

Ronex MP found at Exxon Service Stations

Shell Alvania #2 found at Shell Service Stations

Mobilux #2 found at Mobil Service Stations

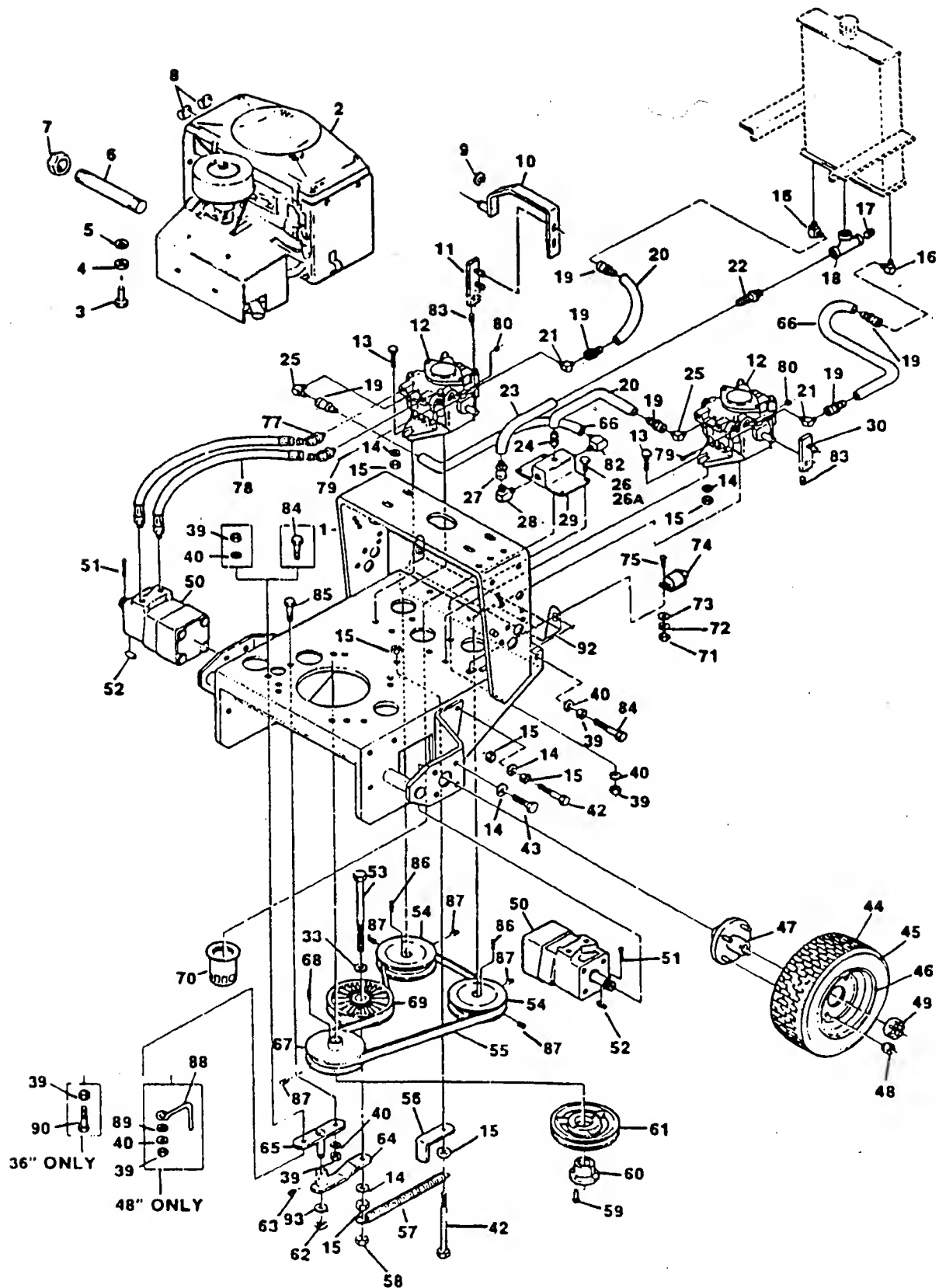
Super Lube M EP #2 and Super Stay-M #2 found at Conoco Service Station

32" CUTTER DECK

Ref. Part No. Number	Description	Ref. Part No. Number	Description
1 46087	Cutter Deck (Includes Decals)	40a *	Washer, 13/32 x 13/16 x 16 ga.
2 46020	Cutter Spindle Assy. (Includes Items 3-9)	41 04029-03	Wing Nut, 3/8-16
2A 46400	Cutter Spindle Assy.	42 48127	Pulley (Includes Items 43-44)
3 04050-04	Retaining Ring, 1" Ext.-Inverted	43 48141	Tapered Hub
4 04050-07	Retaining Ring, 2-7/16 Int.bsc	44 *	Hex Hd. Bolt, 1/4-20 x 3/4
5 48161-02	Bearing, Spindle	45 *	Hex Nut, 5/8-11
5A 48668	Tapered Bearing	46 48278	Belt, Blade Drive
6 41001	Spindle Housing	47 *	Hex Hd. Bolt, 3/8-16 x 5
6A 41007	Spindle Housing	48 *	Hex Nut, 3/8-16
7 48114-02	Grease Fitting, Str., 5/16 Serr	48a *	Hex Nut, 3/8-16 Ctr Locknut
8 43001-02	Spindle, Cutter Blade	49 *	Lockwasher, Spring 3/8
8A 45391	Spindle Shaft	50 04004-02	Support, Belt Cover
9 04041-02	Washer, 1-5/16 x 2-7/16 x 16 ga.	51 45098	Belt Guide
10 04063-08	Key, 1/4 x 1/4 x 2	52 *	Hex Hd. Bolt, 7/16-14 x 1-1/4
11 43038	Spacer, Cutter Blade - Small	53 *	Washer, 15/32 x 59/64 x 16 ga.
11A 43201	Spacer, Cutter Blade - Large	54 *	Lockwasher, Spring, 7/16
12 *	Hex Hd. Bolt, 5/16-18 x 1-1/4	55 *	Hex Nut, 7/16-14 Elastic Stop
13 *	Lockwasher, Spring, 5/16	56 45037	Idler Pivot
14 *	Hex Nut, 5/16-18	57 46145	Idler Arm Assy. (Includes Items 22 & 58)
14a *	Hex Nut, 5/16-24	58 48100-05	Bronze Bearing (Gray)
15 48110	Cutter Blade 16 1/2"	59 04050-02	Retaining Ring, 1 1/8" Ext.-"E"
15a 48184	Cutter Blade 16 1/2" Hi Lift	60 04004-04	Stud
16 04040-10	Flat Washer, 5/8 W	61 48269	Idler Pulley, Belt Clutch
17 04001-41	Hex Hd. Bolt, 5/8-11 x 9-1/2	62 46063	Spacer, Idler
18 46079	Caster Assembly (Includes Items 19-28)	63 04070-02	Eyebolt, L.H.
19 04066-01	Quick Pin	64 04070-01	Eyebolt, R.H.
20 43037-01	Spacer, Caster Yoke, 1/2" long	65 43025	Turnbuckle
21 48100-01	Bronze Bearing	66 43022-02	Wing Nut, 5/16-18
22 48114-04	Grease Fitting, Str. 1/4-28	67 43042	Sleeve, Clutch Rod
23 46082	Support Assembly (Includes Items 21, 82)	68 *	Hex Hd. Bolt, 3/8-16 x 2-3/4
24 45006	Caster Yoke	69 44064	Blade Clutch Rod, Lower
25 43022	Sleeve, Caster Wheel Brg.	70 43043	Sleeve, Clutch Rod
26 04001-37	Hex Hd. Bolt, 1/2-13 x 5-1/2	71 *	Cotter Pin, 3/32 x 1
27 *	Hex Locknut, 1/2-13	72 *	Washer, 33/64 x 1 x 16 ga.
28 48307	Wheel Assy. (Includes 13-14a, 29-34)	73 04062-01	Hair Pin, Large
29 48307-02	Tire Only Caster Wheel	74 *	Hex Hd. Bolt, 3/8-16 x 1
NS 48006-03	Inner Tube only	75 42057	Cam Link
30 48307-04	Rim Pair, Caster Wheel	76 44009	Belt Guide
31 48006-07	Retainer, Bearing, Caster Wheel	77 *	Hex Head Bolt, 3/8-16 x 1 1/2"
32 48006-06	Roller Bearing, Caster Wheel	78 48681	Seal, Cutter Spindle
33 48114-03	Grease Fitting, 45° 1/4-28	79 43217	Spindle Bushing
34 48006-05	Hub Assembly	80 04041-08	Washer, 3/4 x 1 1/4 x .035
35 *	Hex Hd Bolt, 5/16-18 x 1"	81 48677	Relief Fitting, Cutter Spindle
36 45100	Discharge Chute	82 48114-04	Grease Fitting, Cutter Spindle
37 *	Hex Nut, 5/16-18 Elastic Stop	83 *	Roll Pin, 1/8 x 1/2"
38 *	Hex Hd Bolt, 5/16-18 x 1	84 *	Flat Washer, 5/16"
39 46157	Belt Cover Assembly (Includes Decal)	85 43218	Sleeve, Cutter Spindle
40 *	Washer, 25/64 x 15/16 x 12 ga.	86 *	Flat Washer, 5/16"

* Common hardware which should be purchased locally. All bolts are Grade 5 plated, all other fasteners are zinc plated.

ENGINE DECK



ENGINE DECK

Ref. No.	Part Number	Description
1	45339	Engine Deck (16" Wide)
2	48190	Engine 13hp Kawasaki
3	.	Bolt, Hex Hd. Metric 8 x 30
3	+	Part Not Required On This Mower
4	+	Part Not Required On This Mower
5	.	Lockwasher, 5/16 Spring
6	+	Part Not Required On This Mower
7	48257	Pipe Cap
8	48059-01	Fuel Hose Clamp
9	04050-10	Retaining Ring, 1/2 "E"
10	45283	Shaft Wldmt. - RH Pump Control
11	46324	Lever Assembly, Pump Control - RH
12	48551	Pump, Sunstrand BDP-10L117
13	.	Bolt, Carriage, 3/8-16 x 1-1/4
14	.	Lockwasher, 3/8
15	.	Hex Nut, 3/8-16
16	48484-01	Elbow, 90 deg. Female 1/4 NPT to 1/4 JIC Male
17	48117	Plug, 3/8 NPT
18	48491	Tee, Galvanized 3/8 NPT
19	48353-02	Coupling, 7/16-20 SAE Flare Swivel to 1/4" Hose Push On
20	48482-04	Hose, 1/4" ID - 10" Long
21	48350-04	Elbow, 90 deg. 7/16-20 JIC to 7/16-20 "Q" Ring
22	48352-03	Coupling, 3/8 Straight Male NPT to 1/2" Hose Push On
23	48351-05	Hose, 1/2" ID, 12" Long
24	48486-01	Elbow, 90 deg. Male 1/4 NPT to 1/4" Hose Push On
25	48350-03	Elbow, 90 deg.
26	.	Bolt, Hex Hd., 5/16-18 x 1" (For 16")
26	.	Bolt, Hex Hd., 5/16-18 x 2-1/2" (For 20")
27	48353-01	Coupling, 3/4-16 SAE Flare Swivel to 1/2" Hose Push On
28	48489-02	Elbow, 90 deg. Male 3/4-16 JIC to 1/2" Male NPT
29	48471	Oil Filter Base (Includes item 70)
30	46323	Lever Assembly, Pump Control - LH
33	.	Flatwasher, 3/8 (.406 x .812 x .065)
34	42802	Battery Box
39	.	Hex Nut, 5/16-18
40	.	Lockwasher, 5/16
41	04011-06	Screw, 10-32 x 3/4" Self Tap
42	.	Bolt, Hex Hd., 3/8-16 x 2-3/4
43	.	Bolt, Hex Hd., 3/8-16 x 1
44	48710	Wheel Assembly (Includes 45, 46, 47, 48)
45	48710-02	Tire, 16 x 6.50, 2 ply
46	48710-04	Rim Assembly
47	48710-05	Wheel Hub (Includes item 48)
48	48004-06	Bolt and Nut
49	04027-02	Hex Castle Nut, 3/4-28 UNEF
50	48437	Motor, White RS
51	.	Cotter Pin, 3/32 x 1-1/4
52	04063-15	Key, 3/16 x 3/16 x .75
53	.	Bolt, Hex Hd., 3/8-16 x 2-1/4
54	48586	Pulley, Pump Shaft
55	48553	Belt, Pump Drive
56	42199	Belt Guide, Cutter - Rear
57	48051	Spring, Pump Belt Idler
58	.	Center Locknut, 3/8-16
59	.	Bolt, Hex Hd., 1/4-20 x 3/4
60	48141	Taper Hub (for 48127)
61	48127	Pulley, Cutter Drive (Includes Hub)
62	04050-02	Retaining Ring, 3/4 Ext. "E"
63	48114-01	Grease Fitting

* Common hardware which should be purchased locally. All bolts Grade 5 plated, all other fasteners zinc plated.

ENGINE DECK CONTINUED ON FOLLOWING PAGE

ENGINE DECK CONT'D

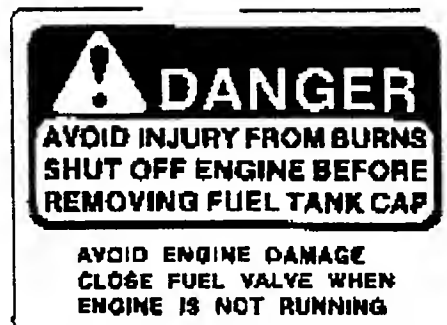
Ref. No.	Part Number	Description
64	46340	Idler Arm, Traction Belt (Includes bushings and grease fitting)
65	45212	Pivot, Idler Arm
66	48482-05	Hose, 1/4" ID - 12" Long
67	48422	Pulley, Pump Drive
68	04063-03	Key, 1/4 x 1/4 x 2-1/2
69	48473	Pulley, Idler - Pump Drive
70	48462-01	Oil Filter
71	"	Hex Nut, #10-32
72	"	Lockwasher, #10 Ext. Tooth
73	"	Washer (.219 x .500 x .049)
74	48305	Switch, Clutch Safety (black)
75	"	Phillips Hd. Machine Screw, 10-32 x 1/2
77	48485-01	Elbow, 45 degree
78	48682	Hose, Pump to Motor
79	"	Screw, Phillips Rd. Head, 1/4-20 x 2
80	"	Hex Nut, 1/4-20 Elastic Stop
82	48352-02	Coupling, 1/4 straight Male NPT to 1/4 Hose Push-on
83	04015-06	Setscrew, #10-32 x 1" Socket Hd.
84	"	Bolt, Hex Hd., 5/16-18 x 1-1/2
85	"	Bolt, Hex Hd., 5/16-18 x 1
86	04063-14	Key, 5.0 x 5.0 x 25mm
87	04012-04	Setscrew, 5/16-18 x 3/8 Socket Hd.
88	44006	Belt Guide
89	"	Flat Washer, 25/64 x 15/16 x 12 ga.
90	"	Bolt, Hex Hd., 5/16-18 x 3-3/4
92	45418	Pully Guard
93	04041-08	Flatwasher, 3/4"
94	04041-08S	Flatwasher, 49/64 x 1-1/4 x .035

* Common hardware which should be purchased locally. All bolts Grade 5 plated, all other fasteners zinc plated.

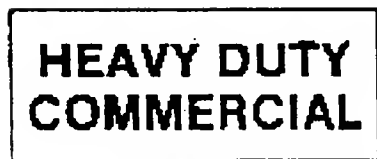
REPLACEMENT DECALS



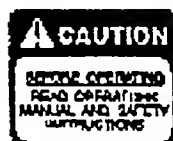
48314
Decal - Scag's Logo
(Located On Cutter Deck Cover - Top Surface)



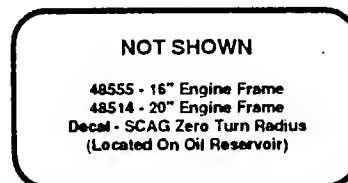
48281
Decal - Operator Warning
Fuel Fill
(Located On Top of Fuel Tank)



48072
Decal - Heavy Duty Commercial
(Located On Cutter Deck Cover - Front Wall)



48713
Decal - Caution Read Operators Manual
(Located Top Of Hydraulic Reservoir)



48555 - 16" Engine Frame
48514 - 20" Engine Frame
Decal - SCAG Zero Turn Radius
(Located On Oil Reservoir)



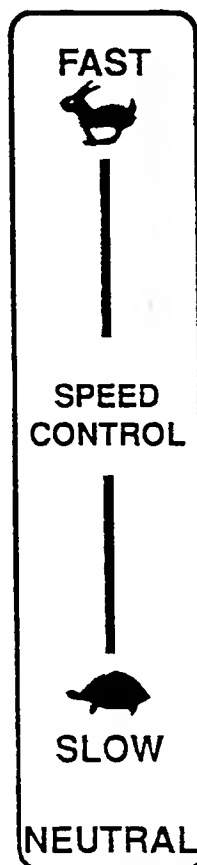
48079
Decal - Key Switch
(Located Near Keyswitch)



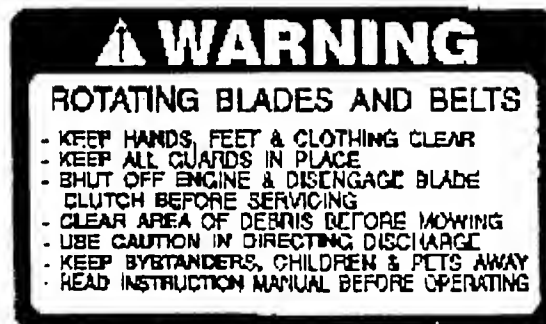
72 48327
61 48320
52 48319
48 48318
36 48316
(Located On Belt Cover)



48712
Decal - Caution Belt Cover
(Located On Cutter Deck Top Surface)



48524
Decal - Speed Control
(Located On Shift Quadrant)

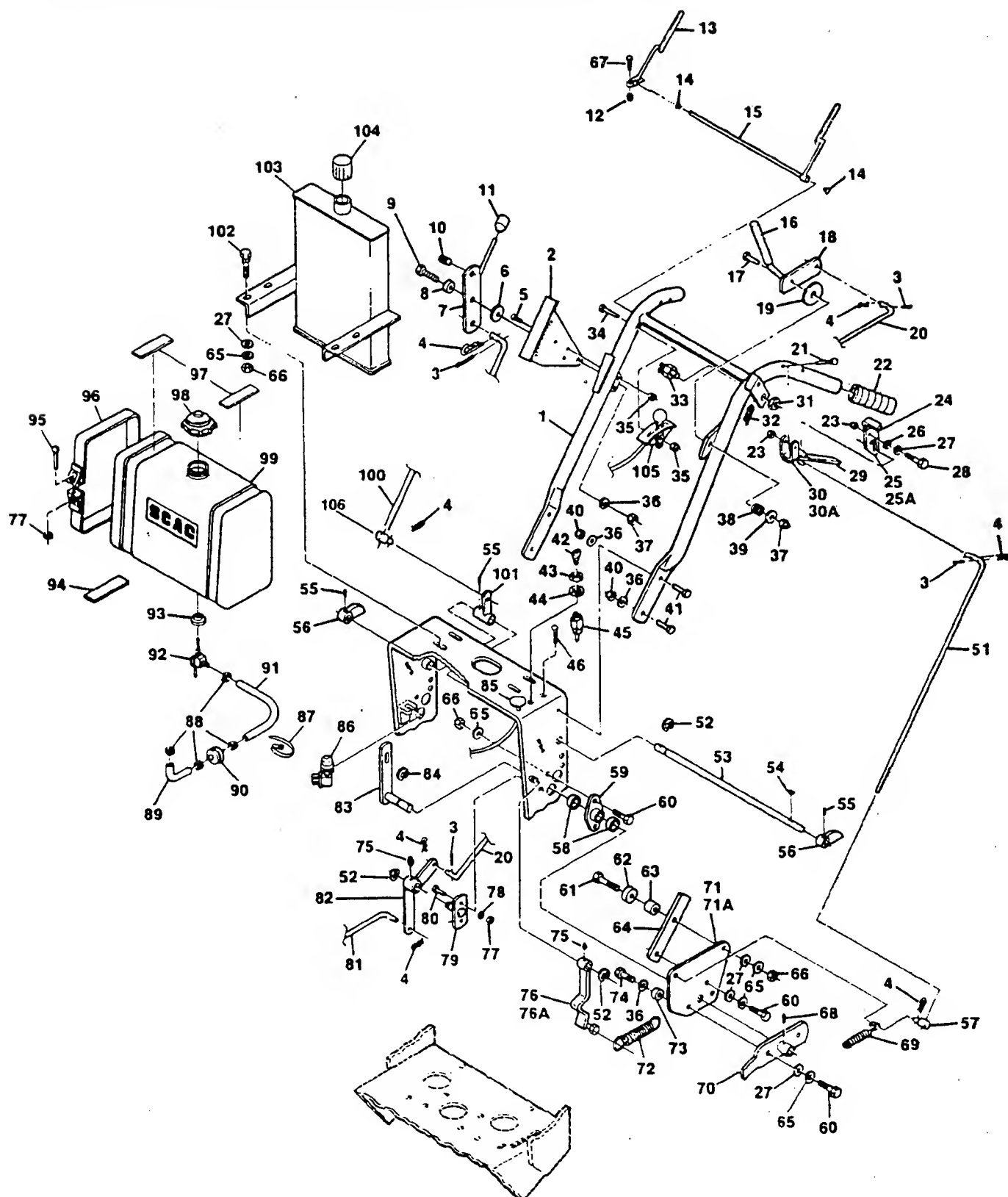


48073
Decal - Danger, Rotating Blades
(Located On Cutter Deck Cover Near Discharge Chute)



48071
Decal - O.P.E.I. Safety
(Located On Cutter Deck Near Discharge Chute)

HANDLE ASSEMBLY



HANDLE ASSEMBLY

Ref. No.	Part Number	Description
1	45341	Handle Assembly
2	42675	Quadrant, Speed Control
3	"	Cotter Pin, 3/32 x 3/4
4	04062-02	Hair Pin, Small
5	04014-01	Capscrew, 1/4-20 x .75 Flat Hd. Hex Socket
6	"	Lockwasher, 3/8
7	45282	Speed Adjustment Lever
8	43086	Bushing, Speed Adjustment Lever
9	"	Bolt, Hex Hd., 3/8-16 X 1-1/2
10	48493-01	Ball Plunger
11	48082	Knob, Speed Adjustment Lever
12	"	Nut, 5/16-18 Elastic Stop
13	45141	Operator Presence, Hand Grip - RH
14	48312	Bushing, Control Rod
15	45417	Operator Presence Hand Grip & Rod - LH
16	48326	Grip, Cutter Deck Engage
17	"	Bolt, Hex Hd., 3/8-16 x 1-3/4
18	46090	Blade Clutch Lever Assy. (Includes grip)
19	04041-10	Flat Washer, 3/8 x 2 x 16 ga.
20	46076	Rod, Bolt Clutch - Cutter
21	"	Carriage Bolt, 5/16-18 x 2-1/2, Rd. Hd. Sq. Nk.
22	48159	Grip, Handle
23	"	Hex Nut, 5/16-18, Elastic Stop
24	48324-01	Grip, Neutral Latch - RH
24	48324-02	Grip, Neutral Latch - LH
25	48083-01	Neutral Latch - RH (Includes grip)
25A	46083-02	Neutral Latch - LH (Includes grip)
26	04032-01	Curved Spring Washer
27	"	Flat Washer, 5/16
28	"	Bolt, Hex Hd., 5/16-18 x 2
29	48492	Grip, Steering Control
30	46333	Steering Control Lever - RH (Includes grip)
30A	46334	Steering Control Lever - LH (Includes grip)
31	04026-01	Hex Nut, 9/16-18 Spring Steel
32	48313	Spring, Grip Return
33	48021	Switch, Interlock (gold colored)
34	"	Bolt, Hex Hd., 1/4-20 x 2
35	"	Hex Nut, 1/4-20 Elastic Stop
36	"	Flat Washer, 3/8 (.406 x .812 x .065)
37	"	Hex Nut, 3/8-16 Elastic Stop
38	48050	Spring, Compression
39	"	Flat Washer, 25/64 x 15/16 x 12 ga.
40	"	Hex Nut, 3/8-16 Elastic Stop
41	"	Bolt, Hex Hd., 3/8-16 x 1
42	48017-02	Key, Ignition
43	48017-04	Hex Nut, 5/8-32
44	48017-03	Lockwasher, 5/8 Internal Tooth
45	48609	Switch, Ignition
46	"	Bolt, Hex Hd., 1/4-20 x 1/2
47	"	Hex Nut, #10-32
48	"	Lockwasher, #10 External Tooth
NS	48610	Wire Harness
NS	48527	Wire Harness Adapter - Kawasaki
50	"	Machine Screw, #10-32 x 1/2 Phillips
51	46294	Control Rod, Steering
52	04050-01	Retaining Ring, 5/8 Ext. - "E"
53	43166	Jackshaft, Speed Control
54	04063-13	Key, 1/8 x 1/2 W/drift #3
55	"	Setcrew, Hex Socket Knurled Cup Pt., 1/4-28 x 1/4
56	48335	Cam, Speed Control (Includes setcrew)

* Common hardware which should be purchased locally. All bolts grade 5 plated, all other fasteners zinc plate.

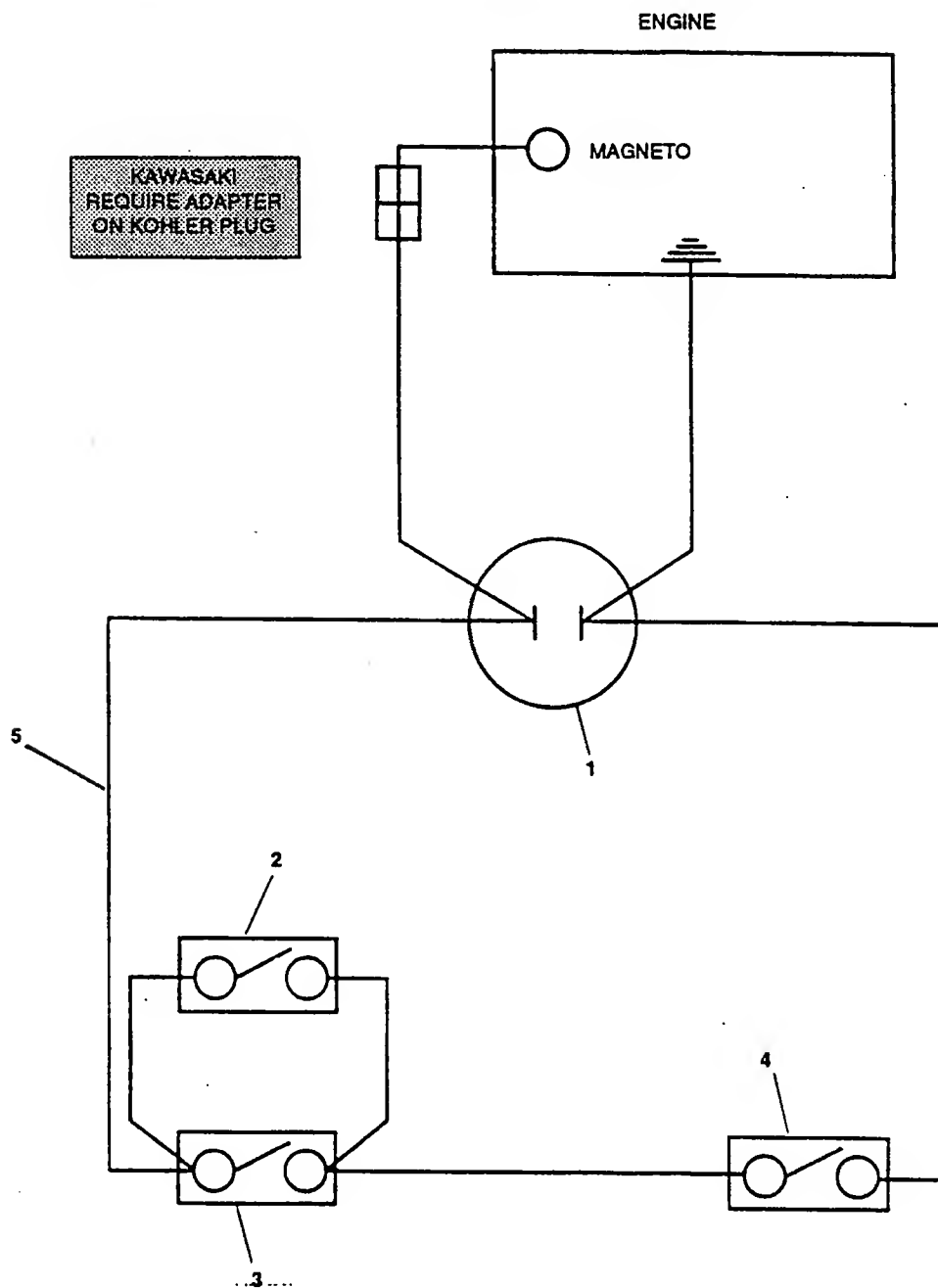
HANDLE ASSEMBLY CONTINUED ON NEXT PAGE

HANDLE ASSEMBLY CONT'D

Ref. No.	Part Number	Description
57	43157	Swivel Joint, Steering Rod
58	48100-04	Bushing
59	46336	Pivot, Pump Control Shaft (Includes bushings and grease fitting)
60	"	Bolt, Hex Hd., 5/16-18 x 1
61	04001-69	Bolt, Hex Hd., 5/16-18 x 1-3/4 Full Thread
62	48409	Bearing, Speed Control
63	43161	Spacer, Speed Control Bearing
64	42730	Bar, Speed Control Adjustment
65	"	Lockwasher, 5/16
66	"	Hex Nut, 5/16-18
67	"	Bolt, Hex Hd., 5/16-18 x 1 1/4
68	04065-05	Drive Pin, 5/32 x 7/8 Type U
69	48494-02	Spring, Speed Control
70	45292	Handle, Neutral Adjustment
71	45271	Bellcrank, LH Control
71A	45272	Bellcrank, RH Control
72	48051	Spring, Neutral Return
73	48224	Bearing, Neutral Return
74	"	Bolt, Hex Hd., 3/8-16 x 3/4
75	48114-05	Grease Fitting, Straight 1/4-28
76	45274	Neutral Cam, RH (Includes grease fitting)
76A	46338	Neutral Cam, LH (Includes grease fitting)
77	"	Hex Nut, 1/4-20
78	"	Lockwasher, 1/4
79	45094	Bellcrank Pivot
80	"	Bolt, Hex Hd., 1/4-20 x 1
81	44064	Rod, Blade Clutch - Lower
82	45277	Bellcrank, Cutter Engage (Includes grease fitting)
83	45295	Shaft, LH Pump Control
84	"	Retaining Ring, 1/2" Ext. - "E"
86	48026	Switch, Neutral
87	48028-01	Cable Tie
88	48059-01	Clamp, Fuel Hose
89	48179-01	Fuel Hose, Short 7/32 ID x 3-1/2 (KA only)
90	48057-02	Fuel Filter
91	48058-05	Fuel Hose, 1/4 ID x 20
92	48308	Valve, Fuel Shut-off
93	48309	Bushing
94	48205	Pad, Rubber - Fuel Tank - Lower
95	"	Machine Screw, 1/4-20 x 2 Round Hd. Slotted
96	42369	Strap, Fuel Tank
97	48292	Pad, Rubber - Fuel Tank - Upper
98	48311	Fuel Tank Cap
99	46174	Fuel Tank Assembly (Includes items 92, 93)
100	46295	Rod, Traction Control
101	45279	Bellcrank, Speed Control
102	"	Carriage Bolt, 5/16-18 x 1 Rd. Hd. Sq. Nk.
103	46430	Oil Reservoir
104	48535	Cap, Oil Reservoir
105	48394	Throttle Control
106	43032	Swivel Joint, Speed Control Rod

* Common hardware which should be purchased locally. All bolts grade 5 plated, all other fasteners zinc plate.

WIRING DIAGRAM FOR MANUAL START



Ref. No.	Part Number	Description
1	48609	Switch, Ignition
2	48026	Switch, Neutral Interlock, N.C.
3	48305	Switch, Cutter Drive Interlock, N.C.
4	48021	Switch, Operator Presence Interlock, N.C.
5	48610	Wire Harness

WARNING

If incorrectly used, this machine can cause severe injury. Those who use and maintain the machine should be trained in its proper use, warned of its dangers, and should read the entire manual before attempting to set up, operate, adjust or service

LIMITED WARRANTY-COMMERCIAL EQUIPMENT

Any part of the Scag commercial mower manufactured by Scag and found, in the reasonable judgment of Scag, to be defective in material or workmanship, will be repaired or replaced by an Authorized Scag Service Dealer without charge for parts and labor.

The Scag mower including any defective part must be returned to an Authorized Scag Service Dealer within the warranty period. The expense of delivering the mower to the dealer for warranty work and the expense of returning it back to the owner after repair or replacement will be paid for by the owner. Scag's responsibility in respect to claims is limited to making the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any Scag mower. Proof of purchase will be required by the dealer to substantiate any warranty claim. All warranty work must be performed by an Authorized Scag Service Dealer.

This warranty is limited to one year from the date of original retail purchase for any Scag mower that is used for commercial purposes, or any other income-producing purpose (90 days for rental use). Traction drive system will be warranted for two full years from date of original retail purchase against defects in material or workmanship excluding hoses, lines and drive belts. Belts and tires are warranted for 90 days against defects in workmanship or materials.

This warranty does not cover any mower that has been subject to misuse, neglect, negligence, or accident, or that has been operated in any way contrary to the operating instructions as specified in the Technical Manual. The warranty does not apply to any damage to the mower that is the result of improper maintenance, or to any mower or parts that have not been assembled or installed as specified in the Technical Manual.

The warranty does not cover any mower that has been altered or modified. In addition, the warranty does not extend to repairs made necessary by normal wear, or by the use of parts or accessories which, in the reasonable judgment of Scag, are either incompatible with the Scag mower or adversely affect its operation, performance or durability. This warranty does not cover engines and electric starters, which are warranted separately by their manufacturer.

Scag Power Equipment reserves the right to change or improve the design of any mower without assuming any obligation to modify any mower previously manufactured.

All other implied warranties are limited in duration to the one (1) year warranty period or ninety (90) days for mowers used for rental purpose. Accordingly, any such implied warranties including merchantability, fitness for a particular purpose, or otherwise, are disclaimed in their entirety after the expiration of the appropriate one-year or ninety day warranty period. Scag's obligation under this warranty is strictly and exclusively limited to the repair or replacement of defective parts and Scag does not assume or authorize anyone to assume for them any other obligation. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Scag assumes no responsibility for incidental, consequential or other damages including, but not limited to, expense for gasoline, expense of delivering the mower to an Authorized Scag Service Dealer and expense of returning it back to the owner, mechanic's travel time, telephone or telegram charges, rental of a like product during the time warranty repairs are being performed, travel, loss or damage to personal property, loss of revenue, loss of use of the mower, loss of time or inconvenience. Some states do not allow the exclusion or limitation of incidental or consequential damages. So the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

PLEASE BE CAREFUL

1. Keep all shields in place, especially grass discharge.
2. Stop machine and remove spark plug wire to adjust or service.
3. When mechanism becomes clogged, stop engine before cleaning.
4. Keep hands, feet and clothing away from power-drive parts.
5. Keep off implement unless seat or platform is provided.
6. Keep others off.

**FAILURE TO FOLLOW CAUTIOUS OPERATING PRACTICES MAY RESULT IN SERIOUS
BODILY INJURY. BESIDES, WE WOULD LIKE YOU TO CONTINUE TO ENJOY AND
PROFIT BY USING OUR PRODUCTS.**

OWNER REFERENCE

MODEL NUMBER _____

SERIAL NUMBER _____

ENGINE MODEL _____

SERIAL NUMBER _____